

AN
ESSAY ON GOUT:
IN WHICH
ITS ACTUAL PREDISPONENT, PROXIMATE, AND
EXCITING CAUSES
ARE CLEARLY DEFINED;
AND
ITS PREVENTIVE AND CURATIVE INDICATIONS
FULLY DEMONSTRATED,
UPON NEW PATHOLOGICAL PRINCIPLES,
WHICH EXHIBIT
A MORE CONSISTENT, SAFE, AND EFFICIENT METHOD OF TREAT-
MENT THAN ANY HITHERTO PROMULGATED.
TO WHICH ARE ADDED,
OBSERVATIONS ON THE MODUS OPERANDI OF
BATH WATERS
IN GOUTY HABITS.

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TO

THOMAS C. HOPE, M.D. F.R. & L.S.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, AND PROFESSOR OF
CHEMISTRY IN THE UNIVERSITY OF EDINBURGH, &c. &c. &c.

MY DEAR SIR,

DEDICATIONS are, for the most part, addressed to public patrons, or private friends: in the latter character I here presume to introduce your name, not with the view of placing this tract, on the subject of Gout, under your literary protection, because, should it require such powerful support, I shall consider it wholly unworthy of your regard; if, on the contrary, it possesses claims above mediocrity, it ought to make its own way. I am, nevertheless, actuated by a private motive—gratitude springs spontaneously from the heart, and is not easily restrained in sensitive minds. Were I to indulge the feelings it excites upon this occasion, I am very apprehensive that

those to whom I may be unknown might suspect me of adulation, which would be alike offensive to you and to me: I cannot, however, suffer this opportunity to escape me without assuring you, that your private friendship, and public instruction in Modern Chemistry, are among the occurrences of my life that afford me peculiar gratification, which neither time nor distance can ever efface from my lively recollection. That the University, in which you have so much and so honourably distinguished yourself, may long enjoy the advantages of your scientific pursuits, must be the anxious wish of all who have profited by your talents and industry, but of none more than,

My dear Sir,

Your obliged and obedient servant,

P. P. PRICE MYDDELTON.

Dublin, January 1st, 1810.

PREFACE.



THE mind of man is, perhaps, never so sedulously or successfully employed, as when the object to which it is directed possesses the power of exciting either his interest or his ambition ; but living, as we do, in a speculative age, when the fascinations of plausible hypothesis, classical language, or unqualified assertion, too often captivate the senses without convincing the judgment, in science as well as politics, it becomes doubly necessary to examine new doctrines with deliberate caution, before we adopt their theory or recommend their practice.

If this principle be applicable to the sciences in general, or to the political occurrences of the world, surely we

ought to observe similar precautions in the more important science of Medicine, in the perfection of which the real happiness of man is so intimately concerned ; for, of all philosophy, the philosophy of Medicine is that which is most conducive to the well-being of the human race. It is presumed that none will deny that a luxuriant imagination, without correct judgment, is, at least, as destructive of genuine science, as the most profound stupidity : the former may, and often has, subverted one system, to establish another still more exceptionable ; the latter, on the contrary, would from habit rather protect than deface the old edifice, which he was taught to respect, at an age when impressions are strong, by teachers whom he esteemed both in public and private life.

The great Lord Bacon says, “Imagination creates, invents, embellishes the arts, but injures real science.”

With this maxim on record, from such imposing authority, it would be more than

presumption to offer vague theory or doubtful practice upon a subject of such magnitude as that of which I shall treat in the subsequent pages. The opinions I advance are drawn from *actual observation* and *chemical experiment*, and the treatment I recommend is sanctioned by the unequivocal test of ample experience. From my infancy I became familiarized with gout, in the persons of my revered parents, whose sufferings, by a quick succession of protracted paroxysms, made a painful impression upon my memory, which increased with my revolving years : a much-loved brother also fell a victim, in his thirty-third year, to irregular gout. Such were my incentives to seek the most prompt and efficient means of counteracting the ravages of that cruel and gigantic foe, which had been so long and so great a scourge to our domestic repose, and that from personal considerations. After the lapse of nearly seventy years, I have the gratification of knowing that I have (by adopting the precautions which I shall hereafter recommend) escaped every sensa-

tion of this formidable malady, and that too under all the disadvantages resulting from the extremes of heat and cold in distant climes, as well as the consequent diversity of food. As some physicians, who possessed more fancy than judgment, have questioned the existence of *hereditary* gout, it may not be amiss to premise the opinions of the ancients, in corroboration of modern observations.

Cælius Aurelianus, who preceded *Galen*, says that “the gout is transferred in a *regular hereditary* course by semen, and for this very reason invades succeeding generations, which we have shewn, chiefly in the books of answers.” These books have not descended to us. “The antecedent causes are various; as, *free drinking, sharp cold, crudities, too much venery, immoderate exercise, or a sudden cessation of accustomed exercises.*”* *Prosper Alpinus* says, “*arthritici multi ibi existunt, ex multis humoribus crudis.*”†

* De Morbis Acutis et Chronicis, lib. V. cap. XI.

† De Medicina Ægyptiorum, lib. I. cap. LVII.

I have before me numerous records of the highest authority, both ancient and modern, which establish the originality of gout as a hereditary disease, but I hope that the proofs which I have adduced will be considered conclusive evidence without further quotation. In my own practice, I have frequently seen regular paroxysms obtain, in male and female children of gouty parents, under the age of ten years, and consequently before they could have imbibed any of the habits, or have been exposed to any of the causes, which generate acquired gout.

Still I am of opinion that the predisponent cause of gout arises from HEREDITARY DEFECT IN THE CONDITION OF THE STOMACH AND ITS SECRETION,*

* Since this edition was put to press, a remarkable case, strongly illustrative of the correctness of this opinion, and of the theory advanced in the subsequent pages, came under my immediate observation, in the person of an infant. His mother had long laboured under urgent symptoms of dyspepsia, which she inherited from her maternal parent; the infant, in consequence, was suckled by a healthy woman: from the period of his birth, acidity in his stomach prevailed,

by which an excess of uric or lithic acid is evolved in the primæ viæ, taken up by the lacteals, and deposited in the mass of circulating fluids. At length, by continued accumulation, the balance of healthful actions being destroyed, it excites irritation, and becomes the proximate cause of gouty paroxysm : and I further am of opinion, that the constitution is not relieved from its disordered functions, until a determination is made to the extremities ; and that the paroxysm will not subside until some portion of the uric acid obtain exit, by exudation, through the exhalants of the skin of that part in

in an unusual degree, which magnesia, cretaceous substances, and even oxyd of bismuth, did not correct. After the lapse of seven months, the kidneys separated the redundant animal acid from the vascular system, as considerable quantities (for so young a subject) of orange-coloured sabulous matter, quite gritty, were daily observed on the diapers. The derangement of the digestive organs continued to increase, and every kind of food was ejected by the stomach ; the bowels were generally regular, and the fæces seldom appeared ill-coloured, although uniformly very offensive. From the ninth month, the lungs evidently participated with the primary disease, and the interesting little sufferer died at the age of one year and one week, reduced to a state of the utmost emaciation.

which it had excited inflammatory action; still leaving behind in the mass of blood another, portion to receive fresh supplies for the reproduction of future paroxysms.

From the earliest ages an attention to regimen was zealously recommended, with curative intentions, and that chiefly of milk and vegetables. *Celsus*, who practised at Rome, in the reign of Augustus, some centuries posterior to *Hippocrates*, says, “some by drinking *asses’ milk* have prevented the gout from returning. Others, by abstaining from *wine*, *mulse*, and *venery*, for a year, have rendered themselves secure from it all their lives. This method is to be pursued after the cessation of the first painful attack”—*idque utique post primum dolorem servandum est, etiam si quievit.**

The necessity of a lacteal diet has also been strongly urged by *Sydenham*, *Boerhaave*, *F. Hoffman*, *Cheyne*, *cum multis auctoribus aliis*. The propriety of a *milk*

* De Medicina, lib. IV. cap. XXIII.

and vegetable diet, under rational regulations, cannot be disputed, but *sudden* transitions from a free indulgence in animal food and fermented liquors, to a meagre regimen, at a period of life too when the *vis vitæ* may be supposed to require the aid of the *vis a tergo*, would be attended with great risk, if not with positive danger. An ingenious modern writer has judiciously chosen a middle course. "The gout," says he, "can be *prevented*, or cured, or very much mitigated, by a *milk diet* mixed with plenty of vegetables, and a spare animal food."* For Italians, to whom this author wrote, his system appears to be unexceptionable: but we must make liberal allowances for the difference of habits, customs, and climates. The natives of Italy, taking them in the aggregate, are accustomed from their cradles to a spare diet: bread, milk, fruits, and vegetables, are the chief articles of their sustenance. *Dans le jardin du monde* vegetation is quick, and the productions excellent: northern re-

* Antonio Cocchi del vitto pitagorico, pp. 63 and 64.

gions, on the contrary, are not blessed with those luxuries without the combined exertions of the head and the hand ; and even these persevering efforts, in such ungenial climes, will neither supply us with the quantity or quality of those comforts of life, which are the spontaneous gifts of the more temperate hemisphere. Nor is the contrast less striking in the physical and moral temperament of the inhabitants.

If it should appear to the candid reader, that I have succeeded in making the theory and practical treatment of gout approximate each other, upon rational principles, my views will be partially attained ; and should it further appear to the arthritic, that I have suggested an easy, safe, and efficacious method of lessening the quantum of human misery, my gratification will be complete.

PREFACE TO THE FOURTH EDITION.



MY Publisher having recently communicated to me, that two copies only of the former impressions of this Essay remain on hand, is my inducement for republishing it, especially as I cannot learn that a single copy has been yet received in this City; to which, I now propose to add, observations on the *MODUS OPERANDI* of the medicinal Waters of Bath, in accordance with my theory of Gout: and it is presumed, that a tract, having for its object the inculcation of new opinions, founded upon just principles, by which the ravages of a tormenting disease may be *SAFELY* and *PROMPTLY* counteracted, will be rather welcomed, than deemed an intruder, at the headquarters of gouty invalids.

Were I to offer support to the practical efficacy of the treatment recommended

in the subsequent pages, by a report of the cases that have fallen under my cognizance, since the publication of the first edition seventeen years ago, I might be suspected of exaggeration. To guard then against even the risk of such imputation, I will merely state, that the results have been uniformly favourable, in cases where the parts acted upon had not passed into a state of actual disorganization and change of structure. I have, also, other reasons for suppressing a report of cases. Such records, under the negative sanction of INITIALS, are no legitimate authority, however respectable the source from whence they emanate; and it would be highly indecorous to publish cases with the names of patients in private practice, a large majority of whom are placed in the elevated ranks of life: and, further, such a detail of cases would have transformed this Essay into a volume, which would have imposed a tax upon the time and the pockets of those who seek information, and that too without increasing its interest.

My views do not embrace "BOOK-MAKING;" nor do I feel any disposition to impugn the doctrines of others, however discordant those doctrines may be to my own opinions. My object is to communicate, and that with brevity, a rational theory, and to suggest the adoption of a corresponding method of treatment, which I have found eminently successful in controlling the paroxysm, and preventing its recurrence.

The avidity of the demand for copies of the former editions was presumptive proof that the doctrines had attracted much attention; and subsequently, ample evidence of their approval has been manifested, by the readiness with which men of high scientific attainments have acquiesced in the application of the treatment which those doctrines recommend.

THE AUTHOR.

New King Street, Bath; Jan. 1, 1827.

AN ESSAY ON GOUT.

SECTION I.

THE subject of the following pages, from its very general prevalence, as well as from the little progress that has been made to guard against its accession, mitigate its severity, shorten its duration, or prevent its recurrence, must be allowed to possess some claims to attention. In pursuing this inquiry it will be necessary to take a comprehensive view of its predisponent, proximate, and exciting causes. If, in so doing, we can accurately ascertain the source from whence the evil springs, the arthritic may, with confidence, indulge the most sanguine expectation of relief; and should a recollection of his former sufferings give stability to *his own* exertions, those flattering hopes will not be indulged in vain. Gout, both as a hereditary and acquired disease, affects

ligamentous and tendinous parts with pain, inflammation, and tumefaction: these pains are chiefly confined to the joints of the extremities, and in that situation no vital danger is to be apprehended: but absolute security, *under the usual treatment*, is, unfortunately, incompatible with a gouty paroxysm, for we frequently see the alarming effects of irregular and retrocedent gout, which invades, in succession, the most important organs of the animal and vital functions, without the intervention of any apparently exciting cause; thus producing *phrenitis, syncope, dyspnœa, vomiting, acute pain in the stomach*, and other abdominal viscera; and by sympathetic influence the muscular teguments are also occasionally affected with exquisite sensibility.

In arranging the various phenomena which ought to be considered as predisponent causes of gout, that of an hereditary disposition is most prominent. *Acquired* gout, however, may be induced by any circumstance, either constant or casual, direct or indirect, in its operation, that can bring on atonia of the capillary vessels of

the arterial system, by which that kind of increased excitement is produced, which is a consequence of diminished vital power.

In contemplating this subject, our attention is forcibly directed to the principal organ of digestion, as the original source from whence the vital and animal functions derive their energetic influence. If the condition of the stomach is deranged, be the exciting cause what it may, the ingesta will remain insoluble, and consequently that degree of exhaustion, which is inseparable from organic matter, cannot be duly replenished. Digestion may be impaired, and general atonia induced, by excessive gratification in corporeal pleasures ; by an excess in quantity, or defect in quality, of food ; by the intemperate use of ardent spirits, which not only injure the functions of the stomach, liver, and spleen, but diminish the energy of the nervous system, by coming, as it were, in contact with the eighth pair, which supplies the third or nervous coat of that organ, and by which the sense of hunger is conveyed to the sensorium. Intense application of the mind,

pathemata animi, and sedentary habits, are other sources of indigestion. Anorexia is a frequent, but not a constant symptom of dyspepsia: flatulence and acidity, on the contrary, are uniformly indicative of want of tone in the stomach. When the digestive functions are torpid, whatever we convey into the stomach becomes *instantly* acid, which is discovered by sour eructations, or spontaneous vomiting of acrid matter, and which cannot be the product of the acetous fermentation, from the circumstance of its being generated so suddenly. Again, the quality of the acids is very different: that created by gastric *mutation** is more pungent, and affects the organs

* Authors in general consider this production as a consequence of "gastric fermentation." It is *very doubtful* whether such an event ever obtains, but admitting that it does, it must be induced by some *predominant morbid principle*, acting in *direct opposition* to the salutary solution of alimentary substances. As this corrosive acid cannot be the product of any fermentative process with which we are acquainted, it is more than probable that the fault is in the quantity or quality of the gastric juice *principally*, be the origin of that defect what it may. Some physiologists are of opinion that the gastric juice is occasionally *acid*, *alkaline*, and *saponaceous*, according to the nature of the aliment upon which it may be

of taste more unpleasantly; it is therefore probable that this undefined effect is produced—1st, by the acescent food which constitutes no

required to act: in a vegetable and herbaceous diet, it is always acid. The glands (when in a healthy condition) which secrete the gastric juice, supply the principal organ of digestion so copiously with that fluid, that *Spallanzani* obtained thirty-seven ounces out of the two first stomachs of a sheep, which had been kept from food two days; and such is its solvent power, that it will dissolve bone in the stomach, probably by the union of its acid with the earthy particles of that substance. Nor does it lose its solvent properties by removal from, and being deprived of the aid of the other digestive functions of the stomach, as the following experiments will confirm. 1st, the gastric juice reduces the aliments into an uniform magma, even out of the body, and *in vitro*; it also acts in the same manner on the stomach after death, which proves that its effect is *chemical*, and almost independent of vitality. 2dly, the gastric juice effects the solution of the aliments included in tubes of metal, and consequently defended from any trituration. 3dly, though there is no trituration in *membraneous* stomachs, this action powerfully assists the effect of the digestive juices in animals whose stomach is muscular, such as ducks, geese, pigeons, &c. Some of these birds, bred up with sufficient care that they might not swallow stones, have, nevertheless, broken spheres and tubes of metal, blunted lancets, and rounded pieces of glass, which were introduced into their stomachs.

inconsiderable portion of our aliment ; 2dly, by the saliva, an animal viscid fluid secreted from the blood,* with which our food is triturated,

Monsieur Spallanzani has ascertained that flesh, inclosed in spheres sufficiently strong to resist the muscular action, was completely digested. And, lastly, gastric juice acts by its solvent power, and not as a ferment, because the ordinary and *natural* digestion is attended with no disengagement of gas, inflation, heat, or in a word with any of the phenomena of fermentation.

In order to shew clearly that there is a manifest difference between the gastric juices of different animals, it is sufficient to observe that the gastric juice of the *kite*, the *falcon*, &c. does not dissolve bread, though it digests *flesh*, which is their common food. On the other hand, the gastric juice of the turkey, duck, &c. has no action upon flesh, although it converts the hardest grain into a soft pulp : here, again, we have another instance of the wisdom and accurate arrangement of the Creator for the reciprocal comfort of the different species of organic and animate matter.

* The saliva is formed of water, albumen, phosphate of lime, of soda, ammonia, and muriate of soda : like all albuminous fluids, it lathers when agitated, by absorbing the oxygen of the atmosphere, to which it seems to have great affinity. Its attraction for this gaseous fluid is so considerable, that gold and silver may be oxidized by triturating some leaves of these metals with saliva.

and copiously mixed in mastication; 3dly, by the gastric juice, another highly animalized fluid; and lastly, by the peristaltic motion of the muscular fibres of the stomach. Hence we may infer, that the cause of this morbid acid is owing to the degenerate quality of the gastric juice, occasioned by some error in diet, or the introduction of noxious particles into the stomach, by which its action might be preternaturally increased, or partially suspended. In infancy, this irregularity creates sour vomitings, gripings, and green stools, which would soon destroy so tender a life, were it not corrected by some alkalescent. In youth, this *animal* acid does not seem to be productive of those pains and inconveniences to which infants and those of matured age are liable. This circumstance may be thus explained: while youth is under the control of parental authority, his habits are uniform, and his pursuits active; the process of digestion suffers no interruption from irregularities, and vigorous health accompanies him to the dawn of manhood. Should an excess of acidity prevail in the vascular system of youth,

it may be appropriated to the formation of phosphoric acid, which, by entering into combination with lime, gives firmness and solidity to the bones. But in matured age, when the bones have acquired their utmost degree of strength, the consumption of phosphoric acid being much diminished, the animal acid by which it is in part constituted, must be, in a great degree, disposed of some other way.

SECTION II.

HAVING taken a view of the remote or predisponent cause of gout, we will now proceed to investigate the proximate or immediate cause of this disorder. In considering this subject it is necessary to retain in the mind's eye what has been said relative to the predisponent cause; we shall then have no difficulty in comprehending the nature of the proximate cause, which seems to be the irritative effects of an excess of acid, generated in the stomach, and conveyed into the circulating fluids by the absorbents, which excites the arterial system, in parts most remote from the heart, to morbid action; and in this opinion we are strengthened by the knowledge we have of the probable commencement of gouty paroxysms, a period when ossification is complete, and consequently when the animal acid is not required in so large a quantity to recruit the phos-

phoric acid to that extent which was necessary before the bones had acquired their due solidity.

Monsieur Bertholet says, that the urine of gouty persons contains less animal acid, whence he conjectures, and that "with reason," says Monsieur Chaptal, that this acid is retained in the blood, and conveyed into the articulations, by which an irritation is produced that causes a flux of humours, pain, and swelling.

Paracelsus, in his researches into the constituent parts of urinary calculi, which he calls *Duelech*, unaided as he was by a correct system of chemistry, seems to have formed a pretty accurate idea upon the subject, when he states it to be a substance intermediate between tartar and stone, and that its formation is owing to the modification of an *animal resin*. He also supposed it to be *absolutely similar to the matter of gout*. His followers, however, rejected his conjectures, until modern improvements in chemical science, and recent investigations, confirmed his opinions.

Dr. Wollaston, in a paper read before the Royal Society of London, demonstrated that the concretions which form on the joints of gouty persons, are composed of lithic or uric acid and soda, forming a compound salt, the lithiate or urate of soda.

Dr. George Pearson read a paper before the same Society, in which he relates the result of a series of experiments which he instituted upon more than three hundred urinary calculi; he also mentions the existence of this acid in gouty concretions. The word lithic, borrowed from the term lithiasis, he recommends to be changed to that of ouric or uric.

Fourcroy,* also, about the same period, discovered the uric acid in arthritic concretions; the result of the numerous experiments of Vauquelin are likewise in unison with those already enumerated.

* Annales de Chimie XXVII.

In persons who have long laboured under gout, the quantity of this matter which has been separated from the system is incredible. We well remember a subject that was brought by a resurrection man to one of the dissecting rooms in which we were taught our practical anatomy, the joints of whose hands and feet were completely enveloped by cretaceous nodules, and the different articulations seemed to have been long destitute of synovia : a convincing proof that all communication with the vascular system had been long destroyed in those parts.

The existence of uric acid, in combination with soda, in the circulating system of arthritics, is ascertained by the test of experiment ; but the manner of its introduction is difficult to explain, because it is not known to be present in any article of our sustenance : it is, therefore, the result probably of some chemical arrangement in the animal laboratory, with which we are unacquainted ; but the soda may be produced from various articles of our aliment. It is presumed that one of the fundamental laws of the

animal economy is, a correct neutralization of the circulating fluids; and that any considerable deviation from this healthy condition must induce morbid effects in some part of the system. If acidity, for example, predominates at a very early period of life, while the bones are little more than cartilages, it prevents the formation of that saline-terrene inorganic matter, called phosphate of lime, which alone gives a firm texture to the bony substance, and distinguishes it from soft parts, which was its original state, as appears by the observations of Monsieur Richerand;* hence it is obvious that rickets, or *mol-*

* “By macerating bone in diluted nitrous acid, phosphate of lime will be decomposed, and give off its calcareous base; the bone thus deprived of the principle of its consistence, softens, becomes flexible, and presents the appearance of a cartilage, which by long maceration ultimately resolves into a cellular texture similar to other parts. The bones, then, are only cellular parenchymata, the areolæ of which contain a saline crystalized matter that is separated from the blood, and with which they become incrustated by a power inherent and peculiar to their structure. The same result is obtained by making an inverse analysis: if a bone be boiled for several hours in *Papin's digester*, every organical part of it is dissolved, and forms an abundant gelatine, and there remains

lities ossium, proceeds from this cause. On the other side, when alkalescent particles superabound, some one of the different varieties of *herpes* discovers itself on the surface, according to the difference of idiosyncrasy. It may therefore be fairly presumed, that in those habits where acids, either vegetable or mineral, are taken with impunity, the system is under alka-

a saline inorganic concretion, which can also be obtained by calcination. The respective proportions of the saline and organized parts vary considerably at different periods of life; the bones of the fœtus are at first entirely gelatinous; at the time of birth, and during the first years of life, the organic part superabounds; the bones are therefore less liable to break, and fractures are repaired with greater facility. In youth, the quantity of each constituent part is nearly equal; in adults, the calcareous earth forms almost two-thirds of their substance; and finally, by gradual accumulation in old age, it superabounds, and obliterates the organized parts; therefore bones are then more brittle, frequently broken, and require a greater length of time in the cure. It may, in fact, be said, that the quantity of phosphate of lime deposited in the texture of the bones is in a direct ratio of the age; and that, on the contrary, the energy of the vital faculties of these organs, their flexibility, elasticity, and aptitude to consolidate when their continuity is destroyed by any accident, are absolutely in an inverse proportion."—*Elements of Physiology*.

lescent predominancy ; and instead of deranging any of the animal functions, acids, under such circumstances, will remove cutaneous affections, which experience has long confirmed in sea scurvy, as well as other disorders dependant upon the alkalescent principle.

Nature seems to have wisely and wonderfully provided for her own security in most of the operations of organic matter, and perhaps in none more sedulously than in preserving a just equilibrium in the constituent principles of the circulating fluids, by assigning appropriate emunctories for the exit of superabundant or extraneous matters ; and the outlets to which our present inquiry hath immediate reference, are the kidneys and the excretories of the skin. When the system is surcharged with animal acid, the urine deposits a pink-coloured sediment, which Scheele and other modern chemists found to be uric or lithic acid, and phosphate of lime : this sort of urine is common in those of a gouty diathesis, and when the precipitation is considerable, it is indicative of the termination of the

paroxysm ; but should this copious pink-coloured sediment suddenly disappear, we may expect, and that with some degree of certainty, a renewal of the attack. The emunctories of the skin, also, when free from morbid obstruction, contribute largely to remove superabundant or noxious particles from the circulating fluids; and in arthritic habits, the matter thus emitted from the cuticular exhalants assail the olfactory nerves with a peculiarly acid impression. Should the reader require further evidence of the quality of this perspiration, he is referred to the experiments of Monsieur Berthollet, who ascertained the fact of paper stained blue by litmus, becoming *red* when brought into contract with the perspirable matter of *arthritic* inflammation, than which nothing can be more conclusive. But in those multiplied instances where, from inordinate gratification in articles of diet that yield an excess of acetic or carbonic acid, or in those who may be preternaturally disposed to the formation of animal acid, the system becomes supersaturated to such a degree that the kidneys and excretories of the skin are inade-

quate, by their united efforts, to discharge the offending matter, which, by being in part retained, progressively accumulates until disease be generated.

From the experiments of Dr. Wollaston it appears that uric acid, either in its individual state, or in combination with soda, forming the matter of gouty concretion or urate of soda, requires a very great proportion of fluid to hold it in solution: whenever, therefore, it morbidly predominates, it is natural to expect its separation, and consequent deposition in a solid form; and the part to which it may be destined will probably depend upon the difference of idiosyncrasy. In some, the kidneys may effect this morbid mutation, and produce sand or urinary calculi; in others, the ligamentous and tendinous parts will be visited by the morbid excess of this acid, so as to induce a peculiar irritation—the absolute source of *arthritic inflammation*. Even in incipient paroxysms, the extremities undergo considerable derangement—weakness, thickening and stiffness of the

articulations, are a common consequence ; they, nevertheless, soon recover their tone, when relieved from the presence of the gouty acrimony by exudation or absorption.

But if these attacks be renewed in quick succession, or are of long duration, we have little to hope from the action of the absorbents : the degree of atonia induced by repeated paroxysms at short intervals, in parts, both from their situation and structure, possessing little vital energy, must accelerate the accumulation of gouty matter, which, at length, deposits itself on the joints in concrete masses, to such an enormous extent, that the ordinary powers of nature are incapable of resisting the rapid increase of these deformities, and all articular motion is consequently destroyed.

Having stated all that seems, at present, necessary to be said on the subject of one of the constituent principles of arthritic concretion, it may not be amiss to offer a few observations on the other component part of that

inorganic matter—*Soda*. It hath been already remarked that soda finds a ready ingress into the stomach, from its being diffused in various articles of food, both animal and vegetable, which we daily partake of: but where it *first* enters into combination with the uric acid, is a question difficult to solve; nor is it necessary to risk vague conjecture to answer our immediate purpose, it being sufficient to know that *it does exist*, which has been proved by the unerring test of well-conducted experiments, and that in unity with uric acid. We also know that it is found in the *Hepatic* secretion. But in neither of these states is it conducive to any morbid action, for that is the effect of *insoluble* matter, and a prominent feature in the chemical composition of uric acid. Soda, on the contrary, possesses the inherent property of destroying the cohesive principle of organized and inorganic matter (with very few exceptions, and those under peculiar circumstances), and consequently of increasing the solubility of animal concretion: its combination, therefore, with uric acid we must consider of salutary

import, and intended by the Great Chemist of the Universe to counteract the injurious effects of its acrimony upon the tender coats of the lacteal, and sanguiferous vessels.

From this view of the subject, *uric acid* is unquestionably the source of those acutely painful diseases, the *gout*, the *gravel*, and the *stone*; and this opinion will be corroborated if we refer to the specific condition of the stomach, enumerated as one of the alleged predisponent causes of gout: the acid perspirations also, especially on the approach, and during the continuance of a gouty paroxysm, as well as the exudation of saline terrene matter from the pores of the diseased parts (which generally precedes the termination of the fit), may be called in to support this hypothesis.

SECTION III.

As it is hoped that we have satisfactorily considered the predisponent and proximate causes of gout, our next inquiry shall be directed to the exciting causes of that disease.

It hath been already mentioned that the kidneys and emunctories of the skin are the safeguards to which the animal functions owe their conservation from many diseases, especially those dependant upon redundant acrimony; consequently, when these outlets are morbidly incapacitated from performing their appropriate offices, *to their usual extent, and with their accustomed regularity*, the system must become superabundantly charged with animal acid. Whatever, therefore, can induce

either of these effects must be considered as exciting causes of gout or gravel, dependant upon idiosyncrasy.

The venerable and sagacious Cullen, (whose memory must be revered as long as intellect and science exalt the literary character of man,) mentions "the ceasing of usual labour, cold applied to the lower extremities, and night-watching," as exciting causes; to which we may add, exposure of the body to inclement weather or seasons, and slight clothing: all these causes, however, point to one and the same object—a diminution of the quantum of perspirable matter, by which the acid excreta of the cutis becomes morbidly retained. If we walk or ride fast, or submit to any laborious occupation, we perspire in a relative proportion; if we immerse our feet in cold water, unless followed by immediate re-action, or even suffer them to continue damp, the effect is often transmitted, and that rapidly, to the general system, with the sensations of chills and heats, as well as other symptoms of pyrexia. Night-watching is productive

of various effects that might generate disease, independently of night air being more humid, and of course less capable of dissolving, and removing, in the form of vapour, the cuticular exudation. It requires little reflection to know, that the exhalants of the skin are more open, and that we perspire more copiously, in bed, where the temperature is increased and more uniform, than during the casual occurrences of the day, and the vicissitudes of the weather: in the labouring class of the community, this position may, perhaps, be reversed, from their active pursuits by day and cold lodging by night. Night-watching also produces general debility, by depriving the animal functions of that repose, which is so necessary, and which the laws of animate matter destined to recruit its inevitable and daily exhaustion: hence the capillary arteries of the cutis must lose part of their vital energy. And lastly, exposure of the body to the effects of cold, will induce a contraction of the cuticular exhalants to that degree which must prevent the escape of the perspirable matter. The kidneys, also, may refuse to

perform their functions, from local injury, chronic affection, or by the indirect application of acrid stimulants, conveyed to these organs through the medium of the stomach.

It has been often observed by arthritics, and their immediate attendants, that the appetite is preternaturally excited, two or three days previous to the accession of a gouty paroxysm: this circumstance has induced many to believe that the fit was a consequence of gratifying such propensity, as the indulgence was soon followed by acid eructations, flatulency, and the other concomitant symptoms of dyspepsia: but it is probable that this inordinate desire for food originates in *gastric irritability*, and is merely symptomatic of the approaching attack.

The numbness, sense of pricking in the lower extremities, spasms of the muscles of the legs and thighs, as well as coldness of the legs and feet, which all arthritics feel in a certain degree, are doubtless the result of a deficiency of vital energy to propel the blood through the remote

and minute ramifications of the arterial system, with that efficiency which is alone compatible with a state of perfect health.

That the more delicate sex are sometimes afflicted with this painful malady we readily admit, but we can generally trace their sufferings to an *hereditary* source, and when we cannot, both inclination and fact combine to refer this acquired gout to some of the predisponent causes, *not dependant upon irregular habits*: on the contrary, acquired gout in man is too often a consequence of voluptuous indulgence, an excess of sensual pleasures, or an habitual use of *vinous* beverages.

It hath been remarked, even by the lower order of the community, in those countries to which we shall have occasion to allude, that certain liquors in common use almost uniformly produce similar effects, without any regard to idiosyncrasy: the force of habit, therefore, must be allowed to possess great influence

over the body, when uncontrolled by the caprices of the mind.

Le vin du pays, ou le petit vin, of the northern provinces of France and Germany, are so weak as not to possess a sufficient quantity of alcohol to prevent their becoming acid at an early period, before they can be consumed or disposed of, especially if the vintage be abundant; because, in that case, the fermentative process is often imperfectly conducted, which is another source of premature acidity: in those countries chronic rheumatism and urinary calculi are endemic disorders.

The late Doctor Huxham (so celebrated in the annals of medicine, who was a practical physician of distinguished reputation in Devonshire, where cider is the common beverage of at least three-fourths of the inhabitants, and that of the poorest quality, the better sort being sent to distant markets,) observed and recorded in the subsequent quotation the existence of

a connexion between the use of cider and arthritic and rheumatic affections: “Nec certe longe differt vinum Rhenanum a *pomatia* generoso quòd hoc multo plus *mucilaginis* habeat.—Utraque horum mustea si bibis affatim, doloribus colicis et *rheumaticis* certo certius vexabere; nec arthritidi obnoxii hæcce hauriunt impunè, quippe quos protinus corripit paroxysmus. Nec graves pœnas luunt bibaces Germani, ad ripas Rheni et Mosae incolæ, se vino *tartareo* ingurgitantes, quam nostrates pomaceum avidè perpotantes; ibi enim, et hic, arthritidis morbus est endemicus, et maxime communis; neque tot uspiam, etiam inter plebeculam, *podagra* laborant, quot in *damnonia* provincia, ob pomaceum notissima. Ac credere fas est, morbi hujus frequentiae causam fuisse multum et continuum vinorum usum, *tartaro* maxime abundantium; qualia sunt vina Mosellanica, Gallica, et *pomacea* nostra: ex quo enim horum invaluit usus, longè magis quàm antè increbuit arthritidis. Vinum Burdegalense, præsentis ævi delicias! haud magni fecit ætas elapsa; et decuplo plus *poma-*

cei nunc factum et epotum est, quam annis abhinc triginta."

De Morbo Colico Damnoniorum, p. xiii.

Having resided many years in Herefordshire, which is so justly esteemed the first cider county in England (not only from the excellence of the fruits, but from the peculiar and very superior method of reducing the apples to a pulpy state, together with the after management), we have observed that the generality of the inhabitants indulge to excess in their native and favourite beverage, both on the approach, and immediately after a plentiful crop; and from the official situation we formerly held in the general infirmary of that county, we were enabled to ascertain that a large majority, both of the in and out patients, were afflicted with chronic rheumatism; although many of them were admitted on the books of the hospital for other disorders; and in our private practice we have often remarked the prevalence of gout, rheumatism, and nephritic diseases.

The more potent wines of Portugal would seem, from their frequently sudden effects upon persons of arthritic diathesis, to be more an exciting cause of gouty paroxysms, than an occasional cause of rheumatism or gravel. Ale and beer also are other fermented liquors which acquire a considerable degree of acidity *from age*; and, *in that state*, they unquestionably promote the formation of human calculi; but *fresh* malt liquor, which is likewise the result of the vinous fermentation, contains a large portion of nutriment, in the form of saccharine and gelatinous matter, with a very trifling quantity of acid; hence it would appear that the fermentative process which produces ale and beer generates less acid than that of wine, cider, or perry; and consequently must be a more appropriate beverage for arthritics; especially as its alcohol is so nutritively combined as to divest it of those deleterious effects, which are inseparable from distillation, by which it would be deprived of its saccharine and gelatinous matter.

The generality of mankind are little aware of the precarious tenure by which they hold their lives. To the influence of *habit*, and a peculiarly inscrutable *principle of accommodation* in the animal œconomy, we owe the conservation of our health, under circumstances and occurrences frequently inevitable, that would derange, if not destroy it. Should the reader doubt the existence of such powerful auxiliaries, he is referred to the history and customs of various nations, many of whose habits, independently of the difference of climate, are in direct opposition to the salutary laws which regulate the operations of animate matter. The Germans, and the Dutch, for example, we have seen drink ardent spirits, many degrees above proof, and that not mellowed by age, undiluted, with the utmost freedom; and the French soldiery, from their frequent incursions into those countries, have contracted similar habits, although not quite to that extent. But a sense of professional duty calls upon us to make this monitory declaration, that we have also seen the tremulous Bacchanalian ex-

hibit, in his own person, the melancholy characteristics of vital exhaustion, and premature decrepitude,—defective excitability, anxious forebodings, prostration of strength, and a conscious inability to resist any morbid impression with which he may be assailed!—such is the usual subject of atonic gout. The Russians and the Ottomans furnish us with additional proofs of the influence of habit, and existence of a principle of accommodation in the animal œconomy: the former drink spirits more copiously than the Germans and the Hollanders, and the latter chew opium to excess with impunity. It is, indeed, unnecessary to go so far for this sort of corroborative evidence to establish well-known facts. We are acquainted with a gentleman, the brother of a general officer in the British service, who takes two ounces of tincture of opium (*Pharmacopœia Londinensis*) at each dose, to suspend the paroxysm of tetanus, which he is often compelled to repeat two, three, or more times in the course of twenty-four hours; and some idea may be formed of the quantity he consumes, when we state that we have seen

one of his apothecary's bills for that article alone (at a period when that drug was not half as dear as it is at présent), which in a few months amounted to upwards of seventy pounds. To this same influence of habit, and principle of accommodation, operating in a different manner, the *arthritic* may *sometimes* owe his escape from gouty paroxysms after convivial indulgences.

The aptitude of custom may be successfully traced to manual and mental habit : the former is conspicuous in the excellence of our manufactures, and the tasteful productions of art, executed, in general, by men of very inferior intellect ; and the latter manifests itself in the aggrandisement and perfection of the moral and physieal world. If the mind be judiciously employed, and the memory duly exercised, the one will acquire acuteness, and the other the power of retention ; and *vice versa*, if the mind be suffered to remain dormant for any length of time, it will degenerate into a state of comparative imbecility, and the memory will participate in the intellectual wreck. If

our recollection be correct, we think that Mr. Locke observes that "fools draw false conclusions from just principles, whilst madmen draw just conclusions from false principles." Can we desire stronger evidence of the necessity of cultivating those talents, which may, in due season, bring forth hidden treasures? Nor is it less congenial to the dictates of humanity to improve the barren soil, to prevent the vegetation of noxious weeds. Again, if we indulge the mind in a favourite inclination, we shall doubtless excel in that particular pursuit. We have often seen this position verified, and upon one occasion most strongly, in the person of a worthy clergyman, who was as famed for unbounded benevolence as for preaching excellent sermons. But from his embarrassed and inelegant method of expressing his sentiments in conversation (contracted perhaps by habitual solitude), and in writing upon common occurrences, he was stigmatised as a plagiarist during his life: his executors, however, rescued his memory from that odious suspicion, by publishing two volumes of those sermons, which he had himself deliver-

ed, and which did equal credit to his head and his heart. By parity of reasoning, if an established law of the animal œconomy did not determine the fact, the same principle might be safely extended to organized matter, be its structure what it may: when a part has been once under the dominion of a specific morbid action, it will be more yielding, and ready to receive similar impressions, than another part which had not suffered any previous derangement. Thus gout, like the generality of disorders dependant upon local atonia, not only evinces a decided disposition to re-occupy parts primarily affected, but its tendency to return increases in the ratio of its actual occurrence.

It has been already observed, that the exhalants of the skin, and the kidneys, are the appropriate emunctories for carrying off the redundant saline particles from the system: it hath also been remarked, that the strong wines of Portugal exert greater influence over persons of a gouty habit, than over those who are subject to nephritic and rheumatic diseases.

With regard to the cuticular outlet, we are not aware that any thing further is necessary to be stated in this place; but the other mode of evacuating morbid matters from the circulating fluids will require a few observations to elucidate the phenomena by which arthritics occasionally escape a gouty paroxysm after a vinous excess.

It is well known that all wines (except such as are manufactured by the œconomical housewives of England, from gooseberries, currants, raspberries, elder, &c.) are the produce of grapes, which possess, in different degrees and proportions, a vegetable (tartaric) acid and saccharine matter, with water and mucilage in combination.

As there are many varieties of that delicious fruit, so it must be evident that there are as many sorts of wine, of different flavours and qualities: that which is made from the richest fruit contains most saccharine matter, and consequently suspends, in a peculiar combination, the greater quantity of alcohol, which is alone

discoverable by its intoxicating properties, and by distillation. Now, as the diuretic effect of spirit is too well ascertained to admit of argument, so it is probable that, sometimes, after a vinous debauch, the increased excretion from the kidneys may expel the excess of acid which was conveyed into the system by the excess of wine, and thus preserve the equilibrium of health: but should this desirable result not obtain, the superabundant acid will be retained, which might be still further augmented by the diminished action of the exhalants of the skin, in consequence of excess of excitement, and hence a gouty paroxysm of considerable severity may be rationally anticipated.

There is, perhaps, no fact more strongly demonstrated, or that comes more immediately within the observation of every one, than that the more indigent order of the community are seldom, if ever, the subjects of a gouty paroxysm, and as this description of persons appear to us to owe their exemption to two distinct causes, we think it right, for the sake of perspi-

cuity, to separate them into two classes—those who do, and those who do not follow some laborious occupation.

The first class, we are of opinion, purchase their freedom from the morbid matter of gout by the “sweat of their brow,” upon the principle we have already maintained—by the increased action of the cuticular exhalants, which not only carry off any excess of saline particles that might be generated in the system, by some of the various chemical changes which our food undergoes, previous to its nutritious parts entering into the vascular circulation, but also any saline acrimony, which the kidneys may be unable, or unwilling, to separate and discharge: and this opinion derives additional weight from the circumstance of the increased excretion from the skin being uniformly accompanied with pungent and inodorous exhalations. With regard to the other class, it is equally certain that their impoverished diet, and total exclusion from all fermented liquors as well as acescent substances, must not

only secure them from an excess of animal acid, but render them liable to those disorders which are the result of direct debility.

One of the most prominent features of a gouty paroxysm is inflammation, attended with shining tumefaction, and exquisite sensibility ; but that inflammation differs essentially from common inflammation, *be its exciting cause what it may* : arthritic inflammation never *suppurates*, at least we never met with such a termination in the course of our practice, for we cannot consider the peculiar ulcerative process arising from the presence of gouty concretion in that point of view ; nor does it end in schirri or gangrene : again, common local inflammation remains stationary, until it terminates by *resolution, suppuration*, or in one of the ways above mentioned ; but arithritic inflammation too often suddenly retreats from the extremities to some vital part, by which the unhappy patient may be destroyed, as occurred in the clinical case we shall report under the title “arthritis,” in another work. We must, therefore, consider arth-

ritic inflammation as a peculiar affection originating in a *specific* cause.

We learn, practically, that if any common extraneous matter be lodged in the teguments of any part of the body, inflammation will be excited, and continued, more or less, until the offending substance be removed, by the vis medicatrix, or the interference of art. We know also, that in consequence of repeated paroxysms of gout, large depositions of *urate of soda* are made on the joints: these same joints become the seat of arthritic inflammation from time to time, which as regularly subsides, without any effort of nature to dislodge the gouty concretion: hence, again, it is manifest that the inflammation of gout assumes a character widely different from that of other inflammation.

SECTION IV

WE have already endeavoured to trace arthritic concretion and urinary calculi to one and the same source, and, it is presumed, not without some degree of success ; we will, nevertheless, proceed one step further, with the view of establishing an identity of constitution, in which these two, if we may be allowed to call them, lapideous substances reciprocally obtain.

We have, in the routine of long practice and pretty accurate observation, met with gout at one period of life, and gravel at another, in the same subject, and vice versa : in others, nephritic disorders have preceded gouty paroxysms some years.

It hath been stated by some authors, but of this our own experience does not furnish us

with satisfactory proofs, that the children of gouty parents have been afflicted with gravel, and that some of the children of parents who have suffered from urinary calculi, have sustained arthritic paroxysms.

The diagnosis of *inflammatory* gout is so well and so strongly marked, as to preclude the necessity of enlarging upon this part of our subject, especially as there is only one disorder to which it is at all analagous, and that is *acute* rheumatism. It is almost superfluous to hint to the practical physician, the distinguishing characteristics of the two disorders, but as this work may, and probably will, fall into other hands, it might not be improper to observe, that when gout invades, by hereditary right, the *young* subject, which, by the way, is not a common occurrence, it is to be known from acute rheumatism by being attended with *less fever*, *as well as more limited in the points of attack*. Acute rheumatism, for example, will very frequently occupy several joints, both of the upper

and lower extremities, at one and the same time, which seldom happens in gout.

Atonic gout, on the contrary, is a most insidious enemy, which often requires great attention and sound judgment to unmask its delusive appearances: the variety of forms it assumes, as well as the complicated and obscure symptoms that occasionally obtain, must frequently perplex the young physician, and sometimes lead him to suspect the presence of active inflammation, in those very parts which are occupied by this latent and dangerous disease; and should his practical treatment correspond with that opinion, the unfortunate patient must inevitably perish.

Both general observation and individual experience have long since confirmed the decided influence of the medicinal waters of Bath in gouty habits, by successfully urging a wandering, capricious, and terrific enemy, to a local habitation in one or more of the extremities.

As the question remains open for discussion, (none of our predecessors in the inquiry having, we believe, entertained it,) we are induced to state our opinions; and to infer that our theory will support us in solving the problem of their *modus operandi* in arthritic cases of atonic character, in which modification of gout they are more immediately applicable. Three of the component parts of the Bath waters are ascertained to be (by repeated chemical analysis) muriate of soda, sulphate of soda, and oxyd of iron. The two sodas must, it is presumed, without giving much scope to the imagination, at least prevent the further formation of uric or lithic acid in the *primæ viæ*, if not partially neutralize that which had been previously absorbed and diffused throughout the vascular system; and the iron, small as the quantity is admitted to be, acts as a tonic upon the prostrate functions of the principal organ of digestion, by which its tone is early improved, and its secretion more perfectly assimilated for its indispensable action in the digestive process: thus, by its direct application to the absorbent ves-

sels of the stomach, and, perhaps, of the duodenum, an increase of energy is readily imparted, by its stimulus, to the general system, and the constitution acquires sufficient vigour to expel to the extremities the exciting cause of those erratic pains (excess of uric acid floating in the mass of circulating fluids), and almost insupportable anxieties, we meet with in cases of atonic and retrocedent gout: a suspension of the awful train of symptoms follows, as a matter of course, the latter symptoms being *primarily* induced by the sympathetic influence exerted by the stomach over the sensorium, or that organ which is the source of the nervous system, and that through the medium of the par vagum. We have used the term "suspension," because we know that irregularities, apparently trifling, will produce a recurrence of the alarming symptoms; and this hint is given as a caution to a class of patients who are too apt to forget the dangers of the past storm, in the present enjoyments of the succeeding, although sometimes delusive, calm.

In reference to the prompt action of the iron

contained in the Bath waters, we fully coincide in opinion with Sir George Gibbes, that its great divisibility, in a menstruum of such high temperature, is the most probable reason which can be adduced for its very active efficacy in cases where other more powerful chalybeates, in combination with the different alkalies, did not succeed : nor is this a gratuitous opinion, as we well remember corroborative evidence in our own case of dyspepsia. During our residence in France for the education of our children, upwards of twenty years ago, the usual remedies (including preparations of iron) having completely disappointed us, we came to Bath, as our dernier resort ; and such was our state of debility, that our journey from London occupied nearly three days, and removal to and from the carriage in the arms of our attendant became a matter of necessity. The first and second day, being unable to quit our room, the Bath water was brought to us at eight and at noon : on the third day we felt able to walk to the Pump Room ; and so rapid was our recovery, that the seventh day we enjoyed the hospitalities of a

friend, and on the tenth we took leave of our humane and attentive host and hostess (Mr. and Mrs. Gale, of Sydney House), to return to our family with renovated health.

In atonic gout, the joints of the extremities will be often free from any painful sensation, while the stomach will be seriously disordered with nausea, loss of appetite, flatulency, vomiting, and acute pains, extending to the intestines, which are frequently accompanied with urgent symptoms of hypochondriasis: nor are the viscera of the middle cavity, or the head, exempt from those alarming visitations: in the former, it produces difficult respiration, great anxiety, palpitations, and even syncope; in the latter, vertigo, apoplexy, and paralysis.

The existence of a gouty diathesis, *the passive state of the pulse*, the inconsiderable degree of fever, and the tardy progress of the disease, combine to distinguish the diagnostic signs of arthritis atonica from those of active inflammation.

There is one other insidious disorder, dependant, perhaps, in some degree, upon an excess of acidity in the fluids. It appears to be more distressing in its consequences, than acutely painful in its attack, or fatal in its termination; in as much as it incapacitates the patient from performing the common duties of domestic life; and as its progress is regular, without suffering any remission, premature decrepitude ensues.

From the few cases that have come under our own observation, we are inclined to believe that this disease is more the result of a rheumatic than a gouty diathesis, because, in those cases we have seen, the patients were habituated to rheumatic affections, and had never sustained a gouty paroxysm. Men are less liable to this disorder than women, in whom it generally obtains after the fortieth year; and as the catamenial flux approaches its cessation, the advance of this disease becomes more manifest.

The distemper to which we allude is that which Dr. Haygarth, in his Clinical History of Diseases, terms "*nodosity of the joints.*" This experienced physician, and accurate writer, informs us that the larger, as well as the smaller, joints are objects of attack, but that the fingers are most frequently affected. In the cases we have seen, these joints were considerably enlarged, so much so, as to render their mobility difficult, and obtusely painful. These tumefactions we have also observed on the wrists, elbows, knees, and ancles, to a most distressing extent: the muscles, however, we have not seen positively affected; it may, therefore, be deemed a ligamentous derangement, in which the articular processes may ultimately participate.

In two of those cases to which we have alluded, the wrists were so much distorted as to resemble luxations; and in another case, the articulations of the knees and ancles were so stiffened as to render walking impracticable; hence

this may be truly called an insidious disease, of which the unhappy sufferers cannot anticipate the melancholy consequence.

Dr. Haygarth says, and we need not desire better authority, that “the nodes appear most nearly to resemble gout. Both of them are attended with pain and swelling of the joints; but they differ essentially in many distinguishing circumstances. 1st, In the gout, the skin and other integuments are generally inflamed, with pain which is often acute, soreness to the touch, redness and swelling of the soft parts, but in no respect like the hardness of bone. 2dly, Gout attacks the patient in paroxysms of a few days, weeks, or months, and has complete intermissions at first for years, but afterwards for shorter periods. 3dly, Gout attacks men much more frequently than women. These nodes are clearly distinguishable from acute rheumatism, because they are not attended with fever. The tumour of the joints is much harder, more durable, and less painful, in the former than in the latter disease. The nodes

are totally different from chronic rheumatism, because the latter chiefly affects the muscles, and is seldom affected with any swelling of the affected parts." The remedies employed by Doctor Haygarth consisted of *guaiacum*, *cinchon*, *leeches*, *warm-bathing*, and pumping, vapour bath, sea-bath, antimony, mezereum, aconite, and externally oleum jecoris aselli cum camphora, and bootikins, with various, but not very flattering success.

Previously to the publication of the Doctor's researches upon this interesting subject, we had recommended most of those agents, as well as some others; and in consequence of the little satisfaction we derived, or rather the disappointment we suffered, we had little hesitation in seeking other expedients, in which we could, at least, as rationally confide. Leeches, however, were not applied in any instance, because all our patients were of a temperament that would not justify even local bleeding. Having, according to our usual custom, patiently observed the effect of the different means that we

at first employed, and having duly considered the consequences that were likely to result from them, we were induced to think more favourably of warm bathing than of any other remedy with which we were then acquainted, but the excessive debility it occasioned prevented its being used so often, or continued so long, as the nature of this chronic malady required; hence it was that we perceived the necessity of contriving a medicated hot-bath, that should possess properties that would invigorate, rather than weaken the general system, and that too after long immersion, and frequent use. Perseverance in this plan, according to the exigence of the case, together with that class of medicines which may be denominated alteratively deobstruent, and soda, succeeded with us, in every case that came under our care. There is at this time, in this neighbourhood, a living proof of the success of this method of treatment—the motive power of the joints of the upper and lower extremities had been suspended for some years, which are now restored to their accustomed action and natural size.

We have been inadvertently led into this digression by the importance of the subject, as well as the obscure and limited information which we possessed concerning it, until Doctor Haygarth published his Clinical History ; and without pledging ourselves to execute the task, it is very probable that, at no very distant day, we may be induced to resume the enquiry, and to enter more fully into the history and curative indications of this troublesome disorder.

In contemplating the various diseases to which humanity is liable, we can discover none of greater antiquity, or of more exalted genus, than gout ; for in the writings of the ancients we find it treated of as a familiar disorder ; and if we except the prevalent excesses of modern ages, and refined habits, the same predisponent, proximate, and exciting causes, must have existed from the commencement of the habitable globe. But gout, unlike other disorders, has been invested, from the earliest ages, with peculiar privileges and immunities—its accession has been hailed with joy, and its pangs endured with resig-

nation. Thus, under the delusive impression of being the renovator of health, and an instrument of longevity, patience and flannel took precedence of other palliative and curative indications; but the experiments of Doctor Wollaston have stripped it of its gratuitous prerogatives, and reduced it to a level with other diseases that yield to the influence of medical science.

The nature of arthritic concretion being now *chemically* ascertained, all former hypothesis respecting its supposed origin must give way to that interesting and important discovery, by which its future treatment should be regulated.

In taking a retrospective view of this subject, it would seem that the indications of prevention, and cure, might be judiciously arranged under three distinct heads. 1st, To limit the formation of animal acid, as the probable base of uric acid. 2dly, To remove the superabundant acid from the circulating fluids, the existence of which may be known by the pre-

sence or approach of a gouty paroxysm. And lastly, to restore the general tone of the system to its healthy condition and wonted energy. But the first and last of those indications must be suspended, or, at least, acted upon with great caution, during the continuance of the paroxysm. The most obvious way of complying with the first or preventive indication is, to attend to the state of the stomach, and abstain from acescent food of all kinds, as well as fermented liquors,* more especially wine; for it hath been already shewn that such diet, or vinous indulgence, facilitates the generation of acid in the stomach, which, at length, enters into the vascular circulation, and ultimately produces human calculi, which will be, according to the peculiarities of diathesis, either separated from the mass of blood by the kidneys, and form urinary

* Fresh beer or ale is the least exceptionable of all fermented liquors; but *stale* malt liquor abounds with more acid (though not tartaric) than sound wine. In our own family we uniformly direct this acid to be *neutralized*, from day to day, just before it is drunk, with salt of tartar, by which it acquires all the softness and briskness of fresh beer.

calculi, or be deposited by the minute arterial ramifications of the extremities, as arthritic concretion. If we consider this subject chemically, we are inclined to think that the vegetable acids are more injurious to persons of a gouty or nephritic habit than the stronger *mineral* acids, because the acidifying principle of the latter adheres to its bases with a greater degree of attraction than exists in the same principle of the vegetable acids, and consequently, the former is less likely to enter into any morbid combination in the stomach or duodenum, than the latter.

We have already had occasion to observe, that when the functions of the stomach are deranged, the contents of that organ, be they what they may, even water, are precipitately converted into a pungent acid, not an acid of any fermentative process, but accruing, probably, from a morbid condition, of the gastric juice; for ventricular fermentation is not only not essential to digestion, but an effect of some preternatural existing cause, that would rather

impede than accelerate the solution of animal or vegetable substances.

The process of digestion may be completed in from one to five hours, according to the durability of the matters conveyed into the stomach; upon this occasion the pylorus, or lower orifice, seems to be endowed with *elective* sensibility of suffering that which is reduced into a homogeneous paste, known to physiologists by the name of chyme, to pass into the duodenum, and of retaining such as is not yet dissolved, for the further action of the gastric juice, and its auxiliaries.

But the salutary course of digestion may be opposed by exercise soon after eating, bleeding, bathing, &c. which would remove towards other organs those powers, the concentration of which is necessary to the stomach for alimentary digestion.

From this view of the subject, it is manifest that the healthy condition of the stomach is a

consideration of the first magnitude to those of a gouty or nephritic diathesis ; if the process of digestion be duly conducted, no fermentation will take place in the stomach, and consequently no morbid acidity will be generated in that organ, and conveyed by the absorbents into the sanguiferous system : when, therefore, we find the stomach take on a contrary disposition, we must immediately resort to the fixed vegetable or volatile alkali, or carbonate of soda, to correct that propensity, which should be assisted by a well regulated regimen, and by exciting the kidneys and excretories of the skin to increased action, so as to remove the redundant acid from the system. Thus when the urine deposits a lateritious sediment, diuretics should be given, and their effect promoted by the usual means. When the perspirable matter evinces more than ordinary acidity, that excretion should be encouraged by occasional warm-bathing, flannel next the skin, and woollen hose ; but, during the paroxysm, the adoption of the treatment we shall

recommend in the next section cannot be too strongly inculcated, from the prompt relief which its application uniformly assures, by the abstraction of the morbid matter which produces the local inflammatory action.

In proceeding to investigate the third indication, our attention is forcibly drawn to the morbid condition of the stomach, as the assumed source of general atonia, and the origin of acquired gout. Hence it is manifest, that on a renovation of the impaired functions of the stomach depends a renovation of the animal and vital powers. So long as acidity be suffered to predominate in the *primæ viæ*, that noxious principle will not only readily find its way into the mass of circulating fluids, by means of the absorbents, and generate disease, but it will also impede the salutary process of digestion, by which the quantity of chyle will be diminished, from the imperfect solution of alimentary substances conveyed into the stomach; and consequently the daily consumption of blood, by the

different secretions, cannot be recruited by its natural supply, and to its usual extent, for the maintenance of vigorous health.

If these rational inductions be admitted, it is evident that the most expedient mode of effecting this indication of cure will be, to correct the prevailing acidity, from time to time, while by tonics, or stomachic bitters with aromatics, as will be hereafter explained, we endeavour to subdue the morbid action of the stomach, or improve the quality, or regulate the quantity of the gastric juice, which is, probably, under the immediate influence of the muscular and nervous coats of that organ. In carrying these intentions into effect, the adoption of a light and nutritious regimen cannot be too strongly insisted upon, such as game, poultry, fish, rabbits, tripe, boiled calves' head or feet, jellies, custard puddings, soft eggs, boiled milk, or milk pottage, the gravy of roast beef or mutton made palatable with salt and pepper, into which thin pieces of toasted bread should be dipped; and, as the stomach recovers its tone, the different

kinds of animal food may be eaten with safety, as well as such vegetables as possess the least acescent properties. But in pursuing this arrangement, two important objects offer themselves to our consideration; the one is, to eat with caution, so as not to excite the muscular fibres of the stomach to undue action before they are capable of sustaining the increased efforts which a full meal would induce; it will be, therefore, advisable to eat sparingly at a time, and that at shorter intervals, but not so frequent as to interfere with the digestive process of that food which had been last received into the stomach, instead of increased quantity at distant periods. The other is to regulate the exercise of the body, by the quantity and quality of the food that has been conveyed into the stomach. There is another cogent reason which should deter the arthritic from indulging in a full meal. It is well known that repeated paroxysms of gout produce general debility, and consequently the vascular system is not exempt from a considerable degree of delicacy: in proportion then to the quantity of food we eat, will be the

quantity of chyle taken up by the absorbents, and converted into blood; hence plethora may be induced, and the quantity of blood, by exceeding the powers of the weakened vessels, may produce congestions that might terminate in apoplexy, dropsy, asthma, &c.

The acidity and acid eructations will be, perhaps, best relieved by occasional doses of calcined magnesia in mint water, or carbonate of soda; but should these means not succeed, the fixed vegetable or volatile alkali must be had recourse to.

With regard to tonics, much circumspection is required in their exhibition; for should any obstruction of the abdominal viscera exist, cinchona and chalybeates would be highly prejudicial: under such circumstances, we must confide the first part of the cure to stomachic bitters combined with gently stimulating aromatics, such as quassia, colomba, or cascarilla, infused in lime water, until tonics can be administered with safety.

At the commencement, and during the course of this treatment, the state of the stomach and bowels must be duly attended to. At one time an emetic may be indicated, at another a cathartic, to carry off any *sordes* that might interfere with intestinal absorption: occasional opiates also may be required to tranquillize very irritable stomachs; and when great anxiety or languor supervene, it is necessary to increase the excitability by adding camphor and ether.

As we have already delivered our opinion pretty fully on the subject of fermented liquors, it may appear superfluous to repeat that monition in this place, but when we contemplate the inconvenience and interruption our plan might sustain from one indiscretion of this sort, we cannot refrain from renewing our assurances of the injurious tendency of wine, and all fermented liquors; and that which is least exceptionable is *good sound table beer*, not too fresh, nor yet so stale as to acquire acidity by age, or by being exposed to the influence of atmospheric air; but as this nutritious beverage is not always to be

obtained in a state of perfection, we would recommend, as a substitute, good spirit much diluted.

In our intercourse with the world it is almost impossible to adhere to a *rigid* system of abstinence, without risking the loss of that social association which adds to our pleasures and gives a zest to the comforts of life. When, therefore, the arthritic is necessitated to partake of the indulgences of the table, he should do so in a way that may be least injurious to his general health: upon this principle, the stronger wines, such as have *completed* their fermentative process, should obtain a decided preference; of this class we must consider *unadulterated* Madeira, as well as sound old port; but, in order to guard against latent effects, we would recommend the arthritic to take from ten to twenty grains of soda before he sleeps, and repeat the same dose twice or three times the succeeding day. By reviewing the effect of alkalies upon the analogous concretions of gout and gravel, we have demonstrative evidence of their powerful influ-

ence, both in preventing and correcting the morbid principle by which they are generated ; and daily observation ascertained this fact, long before the analytical experiments of Dr. Wollaston determined their chemical properties, and hence enabled us, partially, to account for those salutary changes:

The accurate Cullen remarks, that “ another remedy which has had the appearance of preventing the gout, is an *alkali*, both mild and caustic, lime-water, soap, and absorbent earths. Since it became common to exhibit those medicines in nephritic and calculous cases, it has often happened that they were given to those who were, at the same time, subject to gout ; and it has been observed, that under the use of these medicines, gouty persons have been longer free from the fits of their disease. That, however, the use of these medicines has entirely prevented the returns of the gout, I do not know, because I never pushed the use of those medicines for a long time, being apprehensive that the long-continued use of them might pro-

that the long-continued use of them might produce a hurtful change in the state of the fluids."

*Similar proofs have presented themselves to us, but the most palpable case was that of a respectable clergyman of our acquaintance. In the early part of his life he had indulged in the gratifications of the table; but taking, as he then did, considerable exercise, he suffered no inconvenience. However, as he advanced in years, his habits changed: he continued his usual mode of living; but literary pursuits limited his corporeal exertions, and in a few months he became the subject of a gouty paroxysm, which recurred in quick succession, so as to induce great debility. Nephritic symptoms also manifested themselves, and he frequently voided pretty large quantities of sabulous matter. These pains, though severe, were relatively but little regarded when contrasted with those which he anticipated from the formation of the larger urinary calculi; he therefore determined to devote much of his

* First lines, D. LVIII.

attention to the correction of an evil which he dreaded in the extreme : with this view, he sent to London for a dozen bottles of Blackrie's lixivium (a solution of pure fixed alkali), which he took according to the direction, until the whole was consumed. During that period, he not only lost his nephritic pains, but he escaped his usual paroxysms of gout, without subjecting his appetite to many restraints : he had discontinued his lixivium scarcely two months, when his gout returned with increased severity, which he again suspended by common soap-lye, obtained from the soap-makers ; but this formulæ* would seem a more clean, certain, and accurate method of preparing this medicine, which unquestionably possesses very powerful properties. A perfect knowledge of the *modus operandi* of the fixed alkalies would be

* Eight ounces salt of tartar and four ounces of quick lime (that which is made from calcined oyster-shells is most acrid, and best for this purpose) ; to which add a quart of boiling water : let them remain together twenty or more hours, and then *filtrate* it for use. The dose, from 30 to 60 or 90 drops, three times a day in veal broth.

very desirable, inasmuch as such discovery might lead to other inductions of great importance; but unfortunately this intricate subject is involved in considerable obscurity, by our ignorance of the agency of various chemical affinities that may occur in the stomach, duodenum, and vascular system, under different circumstances; nor have we any very sanguine hopes of overcoming these embarrassments. Although we are unable to account with confidence, either physiologically or chemically, for the action of alkalies upon the acrimonious origin of gout and gravel, surely *a fact* so incontestably proved is not the less entitled to our credence. It is of little consequence to the practical physician, whether the salutary changes which follow the use of alkalies, in arthritic and nephritic cases, be the result of chemical combination, or decomposition, in the *primæ viæ*, or of supersaturation of the circulating fluids, as he is in possession of a more satisfactory and beneficial truth, that a certain effect is uniformly produced by a well-known agent of easy access. If, however, we

may be allowed to offer a conjecture upon this interesting subject, it would seem that the action of alkalies in the *primæ viæ* tend to prevent a fresh accumulation of morbid acrimony; and perhaps, that which has been already deposited, may be removed by the chemical influence of supersaturation.

We have already endeavoured to point out the benefits that are likely to result to the arthritic from a well-regulated system of persevering temperance and bodily exercise, as well as by occasionally exciting the secretions of the kidneys, and the cutis, to an increase of action. Nor will the arthritic alone derive advantage from the adoption of this salutary plan: those who labour under nephritic and rheumatic disorders will reciprocally partake of the promised relief.

Habitual labour and full exercise, so as not to induce considerable fatigue, are known to give tone to the digestive organs, and increase the energy of the muscular fibre. If we exa-

mine the size and texture of the limbs of men accustomed to manual labour, (the blacksmith, for example,) we shall find this position verified, and that from the great and almost constant action of the muscles concerned in the performance of his daily occupation; but if this muscular exertion be too long continued, a state of exhaustion will succeed, which ultimately terminates in premature old age. Similar effects are produced by the stimulus of hunger, and the opposite habit, inordinate excitement of the stomach, by excessive indulgence.

The quantity of insensible perspiration (dependant upon difference of climate and seasons, as well as local temperature) is from two to four pounds in twenty-four hours, issuing in the form of gas or vapour from the minute arterial extremities into the interstices of the laminæ of the epidermis or outer skin, which the atmospheric air receives and carries off, and which removes from the circulating fluids various subtile and noxious particles in chemical combination: hence it is manifest that when the

temperature of the atmosphere is much below the temperature of the human body, the quantum of insensible perspiration must suffer considerable diminution, if it be exposed to its influence; and consequently a rapid derangement of the salutary functions will ensue. If, on the contrary, the temperature of the atmosphere be much above animal temperature, diseases of a different genus will be produced.

One of the consequences of diminished perspiration, and that to which our present subject hath immediate reference, is, a partial retention of the saline particles, or augmentation of the acrimonious principle, which we consider as generative of animal calculi; and unless this morbid impediment be soon removed, or the superabundant acid separated by the increased action of the kidneys, and discharged with the urine, arthritic or nephritic disorders will obtain, dependant upon idiosyncrasy: we should, therefore, early and diligently excite the exhalants of the skin to a renewal of their healthy and appropriate functions.

That an acid, possessing peculiar properties, exists in those of a gouty diathesis, has been already satisfactorily ascertained ; but the following extract of a case of *arthritis retrocedens*, in the first volume of the Medical Observations and Inquiries, is entitled to our particular attention, not only from the singularity of the phenomena, which occurred several times in the same subject, but from its having happened more than half a century ago, without suggesting a correct pathological induction : The patient had gout and *extreme* pain in his feet, heels, and ancles, for ten or twelve days, which, to use his own words, flew as quick as lightning directly to the calves of the legs for about half a minute : with equal violence the pain then ascended to both thighs, where it scarcely remained one minute before it entered the abdomen ; from whence, after giving one acute pang, it proceeded with the same rapidity to the stomach, and vomiting ensued. The patient threw up about a pint and a half of green aqueous liquor, so extremely *corrosive* that he compared it to the *strongest mineral acid* : after this

discharge, the patient slept five or six hours, and on waking found himself quite free from pain; the swelling and tenderness also went entirely off in two days, so as to enable him to follow his usual occupations. During these paroxysms his breath uniformly manifested a considerable degree of fætor, and, as is usual in retrocedent gout, when one part became affected, all pain ceased in the others that had been previously attacked.

SECTION V.

ALTHOUGH the treatment of gout during the paroxysm is the last object of our attention, it is nevertheless the first of our solicitude, and perhaps the most interesting of our research: we, however, wish it to be clearly understood, that in recommending a new method of relieving an old disease, we are neither actuated by vanity or the love of novelty, but by a more laudable principle—a conscious capability of conducting the arthritic *safely* and *expeditiously* through the most painful stage of his trying malady, and that without subjecting him to the *risk* of present danger or future inconvenience!

We are *acutely alive* to the consequences of such an *unconditional* assurance, and our only

consolation is derived from that confidence which *conviction* inspires, founded as it is upon accurate observation, ample experience, and uniform success.

The usual mode of treatment, during the continuance of a gouty paroxysm, is a rigid adherence to strict rules of abstinence, and frequently repeated doses of volatile, or fixed vegetable alkali: the latter is preferred when the skin is hot and dry, with warm diluents, ad libitum, to increase the perspirable matter, by relaxing the cuticular exhalants. The bowels are to be kept moderately free, by the occasional exhibition of a cathartic; and the condition of the stomach may sometimes require a gentle emetic: indeed, we have reported a case in which a spontaneous vomiting has cured the patient, by the sudden ejection of the *materies morbi*.

The first part of this treatment is liable to serious objections, as far as it is referable to the continuance of increased *general* perspiration, during the entire course of a protracted

paroxysm; because it must inevitably produce *universal debility*, and the consequent exhaustion of the animal and vital functions, from which the unhappy sufferer seldom recovers before the accession of another paroxysm: attention to the state of the stomach and bowels is dictated by the precepts of reason and common sense.

A modern writer of talent and eccentricity (of whom we have some personal knowledge) depreciates, and that with great zeal, all former theories of gout, and his new method of treatment is adapted to his preconceived opinions. He thinks that arthritic inflammation and common inflammation differ in nothing but in name, although occasioned by adverse exciting causes. He also denies the existence of retrocedent gout, and endeavours to account for the phenomena which we comprehend under that title, as the effect of sympathy or associative extension of the stimulant influence of the local inflammation; and irregular gout he attributes to “distempered excitability.”

As we cannot concede to his doctrines, we will, at least, give him credit for the purity of his intentions and the plausibility of his arguments, to which he certainly has some claim. On one point we agree in opinion with Dr. Kinglake—that idiopathic or genuine gout is seated in ligamentous and tendinous parts, to which it communicates inflammation and tumefaction ; but we cannot go along with that author and say, that those parts *alone* are objects of gouty irritation ; nor can we, by any means, admit the gratuitous principle, that arthritic inflammation and common inflammation, *from local injury*, are synonymous, in any acceptance of that term.

Having stated our repugnance to that crude system which tolerates the removal of *local* affection by the *actual production of a general and dangerous disease*, than which there cannot be a greater error in Therapeutics ; and giving, as we most sincerely do, a decided negative to Dr. Kinglake's hazardous practice of diminishing animal temperature by coldbathing, cold

affusions, or the topical application of *ice*; we shall now proceed to offer our own suggestions upon this interesting subject.

The new method of treatment, which we shall hereafter recommend, is not the result of vague conjecture or speculative opinion. Its success is confirmed by long experience in our own practice, and we feel a confident persuasion that we shall have little difficulty in convincing the most incorrigible infidel, if he will venture upon a trial of the plan we advise. To enable us to realize the promise we have made to arthritics, an observance of the rules we have prescribed cannot be too strongly inculcated; but should any one prefer convivial indulgences to the restraints of a well-regulated regimen, he will find our arrangement the best calculated to accommodate his inclination for the good things of this world.

From a transient glance it might seem paradoxical, that we should at one time speak of gout as a general disease, and afterwards treat

it as a *local* affection; but we will venture to assert that fair reasoning, without sophistry, will bear us out in what we have, or may hereafter advance upon this subject.

The origin of *hereditary* gout, or the predisponent cause, is universal in the system, and probably coeval with our existence in the foetal state: the remote or predisponent cause of *acquired* gout is as generally diffused through the mass of circulating fluids, without the primogenial honours of hereditary distinction.

The proximate cause, also, is general in its tendency and progressive in its advance. But it is the *exciting* cause, which, in our opinion, constitutes the *local* disease, and this position we will endeavour to elucidate satisfactorily.

All authors, from remote antiquity down to the present time, admit the pre-existence of cause before the development of effect, in gout as well as other distempers: thus far it may be considered a general though a latent disease, which would

not obtain without the application of a diffusive stimulus; *the concentration of which, and its determination to fixed points*, is the *exciting* cause, whether it be from local depositions of urate of soda, or from the preternatural irritation of redundant acrimony in particular parts, remote from the centre of vitality, and consequently not endowed with sufficient energy to resist the morbid impression.

Erratic or wandering gout, as the offspring of undue excitability, indicates the application of internal and external stimuli. Considering, as we do, that local disorder to be genuine gout, which exhibits the appearance of increased excitement, by articular inflammation, shining tumefaction, great pain, and less fever than we usually meet with in other inflammatory diseases, so our treatment will be directed to the reduction of that high degree of excitability; not upon the destructive principle of revulsion, or the *more insidious* practice of inducing general debility, but by the more rational, safe, and efficient plan of *increasing the energy of the*

enfeebled absorbents, and exciting the augmented action of the emunctories of the skin of that part only which is the seat of morbid excitement.

The progressive improvements in chemical science have illumined with the refulgent rays of celestial truth many of the phenomena of animate matter, which the ancients looked upon as inexplicable, and out of the reach of human research. To the same laudable spirit of investigation we are indebted for the modern discovery of the constituent principles of that gaseous ocean of elastic transparent fluid—atmospheric air,* which, in a state of purity, is so conducive to the health of all animals; but as it varies from the following standard of proportions, so, in that ratio, will it be unfit for sustaining the principle of animal life with ease and safety.

Oxygen, or vital principle	24
Azot, or Nitrogen,	} Modifying principles,	{ 75
Hydrogen,.....		
		<hr/> 100

* The ancients were, nevertheless, by no means ignorant of the existence of a peculiar principle in the air, capable of

The application of pneumatic chemistry to the purposes of health has succeeded in very many instances. Several chemists of the last and some of the present century have perpetuated their names, in the records of science, by the success of their researches: of this number, was the celebrated Dr. Priestley, who on the first day of August, 1774, had the singular good fortune to discover the most interesting substance that exists upon earth, to which he gave the name of *dephlogisticated air*, and which, according to the modern nomenclature, is known by the name of *oxygen*, from *οξυς* acid, *γίνομαι* to become, or *γέμω* to produce. It is an inherent principle in many minerals, in different degrees of proportion, from which it may be obtained by chemical combination and caloric, for which it has great capacity. It is also universally diffused through the vegetable kingdom by the act of vegetation, and developed by the influence of light, and the

nourishing and supporting animal life, to which they gave the name of *pabulum vitæ*, and Hippocrates expressly says, *spiritus etiam alimentum est*.

stronger the light, the more readily will it be disengaged in a gaseous form: but the *direct* operation of the sun's rays is not essential to the production of this phenomenon, which seems to have been intended by the great Author of nature to repair the continual consumption of vital air by respiration, combustion, and the alteration of bodies by fermentation and putrefaction: thus the equilibrium between the constituent principles of the atmosphere is duly maintained for the preservation of animal and vegetable life. A variety of experiments may be instituted to establish the fact, beyond the possibility of doubt, that it is the *oxygen* which the atmosphere contains that fits it for the respiration of animals, propagation of vegetables, and combustion of matter. If we impregnate the air of a glass vase with our breath (by means of the pneumatic trough), or, in other words, exhaust the oxygen it contained, it will instantly extinguish the flame of a candle. The same effect may be produced by placing a lighted candle under a receiver, or inverted glass jar: as the oxygen is gradually consumed, the flame becomes faint,

and soon disappears altogether; on the contrary, if we charge any vessel with oxygenous gas, and subject an ignited match or candle to its action, it will burn with extraordinary splendour, and if we destroy the flame, its application will instantly rekindle it. Again, if we seclude any plant from light, it will pine and soon perish. *Oxygen* is more ponderous than atmospheric air, as 1103 is to 1000, without manifesting any variation on the surface of the earth, and at an elevation of twenty-two thousand feet; on the other hand, it is lighter than water, as one to 740, at a temperature of 60, in cubic inches.

To the influence of the matter of light, according to its degree of intensity, it is probable that the difference of colours, both in the animal and vegetable kingdoms, chiefly depends. The plumage of birds and the hair of quadrupeds of Equatorial countries are uniformly of a brighter colour than those of the polar regions. The phenomena of many northern animals, which are dark-coloured in summer, becoming grey or white in winter, is too well known to admit of

argument. In men, the colour of the external surface depends upon that of the *rete mucosum*, and the different gradations of shade of the human skin are owing to the comparative quantities of carbon and oxygen it contains, dependent upon the force and duration of light.*

The inhabitants of the Torrid Zone, being exposed to the stronger light in an intense degree, suffer a continued subtraction of oxygen, and are consequently black, from the predominance of carbon in the *rete mucosum*. The Americans, in the southern parts of that continent, as

* Though the difference of the colour of the skin in different nations must have originally depended entirely on the chemical influence of light, yet when these colours are once produced, their changes are in some measure dependent on the mind.

When certain colours are considered as beautiful, the generating imagination makes them hereditary, and the chemical changes from the influence of light are more slowly produced.

Thus Europeans, though exposed to light in the African countries, do not become black, but in great length of time; and negroes, though deprived of light, their accustomed oxygen attractor, are not blanched for many generations.

DAVY.

well as the natives of Asia, are liable to the action of strong light, but not to that extreme which the Africans endure; the subtraction of oxygen is, therefore, proportionably lessened—they are copper-coloured or tawny. In the southern and western parts of the continent of Europe, the attraction of oxygen is still further diminished: there the inhabitants are brown or swarthy. But in northern countries, where the subtraction of oxygen is very inconsiderable, and limited to the few summer months, the inhabitants are white, especially such parts as are covered, and least exposed to the action of light. Similar mutable appearances obtain in birds and fish: the feathers of the back, which receive uninterrupted light, are of a dark colour, while those of the belly and sides are of a light colour, with very few exceptions, and those arising from peculiarity of species. The backs and bellies of fish also uniformly exhibit the like contrast, and their capability of sustaining life, when long and completely immersed in their own element, is owing to their bladders uniformly containing *pure oxygen*. In the culture of herbaceous

legumes and flowers we observe the influence of the same principle: such as are exposed to the uninterrupted action of the sun's rays become spotted, and tinged yellow, orange, or brown (indications of disease), whilst similar plants and flowers, in the seclusion of shade, retain their colours in a state of purity. In physiology, we again trace the powers of oxygen: it is conveyed to the lungs by every inspiration, and gives to arterial blood its florid colour and stimulant properties; venous blood, on the contrary, is black in colour, and languid in motion, from the loss of oxygen and excess of carbon.

The existence of a sympathetic and reciprocal connexion between the exhalants of the lungs and those of the cutis, is as well known to physiologists, as the reciprocity of influence that invariably subsists between the emunctories of the skin and the intestinal canal; and the stimulant effect of oxygen upon the respiratory organs, as well as its capability of exciting the dormant powers of suspended animation, are subjects of equal notoriety.

Tiberius Cavallo, in his essay on the medical properties of factitious airs, in allusion to *oxygen*, says, "it is a gentle stimulus, which, by invigorating the various parts of the animal body, by communicating firmness to the solids, and energy to the fluids, does frequently obliterate the causes of morbid habits." By analogical reasoning, if oxygen can be conveyed *direct*, by inspiration, to vital organs, even when in a state of derangement, surely the most captious sceptic will not presume to deny that it may be applied, with perfect safety, to *external* surfaces. The gently exciting and invigorating powers of *oxygen* being thus simultaneously combined, and fairly admitted, we approximate that point to which a love of research, and motives of philanthropy, will, we trust, ultimately lead us.—Although *oxygen* has been exhibited in a gaseous form many years, yet it has never been recommended as a *topical* application in any disease. *Fourcroy* and *Alyon*, indeed, have given us two formulas of a pomatum.*

* Tromsdorf's Journal de Pharmacie, vol. viii, No. 1, p. 162.

The former says, "if the oxygenated pomatum should not prove of any avail in medicine, it might be made use of to subdue quicksilver the sooner, and to prepare the ointment of it in a fifth of the time that is usually required." The employment of *oxygen*, in union with any oily substance, appears to us highly exceptionable, not only from the pain which friction must produce on parts so exquisitely sensible to the touch as those under the influence of arthritic inflammation, but from the obvious circumstance of unctuous applications obstructing the pores of the skin, and thence prevent the exit of the perspirable matter, so essential to the removal of the morbid redundant acrimony of gout.

Under these considerations, other mediums of communication were tried, and after a tedious and protracted series of experiments, an aqueous menstruum proved to be the most appropriate vehicle for conveying the concentrated oxygen to such parts as may be invaded by arthritic inflammation, in the form of a bath, at a judiciously regulated temperature.

When the extremities are the seat of morbid action, the *local* bath can be used without difficulty ; but when the shoulder, vertebræ, hips, or knees, are objects of attack, we apply the oxygenated fomentation, which should be repeated often ; unless, indeed, we endeavour to solicit the disease from those parts to the extremities, by the immersion of the feet or hands, as circumstances may direct, in the oxygenated bath, two, three, or more times in the the course of the day.

Inveterate cases require the bath night and morning, and its duration should be regulated by the force of paroxysm.

In recent or slight attacks, a single immersion will frequently remove the pain, inflammation, and swelling, with astonishing celerity, and we are not acquainted with a *single instance* in which *retrocedent* gout occurred during or after the use of the oxygenated bath or fomentation, but we have often seen it attract the morbid matter from vital parts to the extremities.

Since we have been engaged in prosecuting this inquiry, we have put the medicinal virtues of oxygen to the severest trials, under circumstances the most hopeless—that of confirmed *anchylosis*, from the formation of arthritic concretion: even in these deplorable cases, a steady perseverance in the daily use of the oxygenated bath has reduced the joints to their original size, and restored them to their motive powers: hence it is manifest that the organized articular structure is not always irrecoverably altered by those morbid depositions.

There is another disease in which we have employed the oxygenated bath with decided advantage, and that too after powerful agents, in hospital practice, had been resorted to in vain; namely, those cases of partial paralysis of the hands and wrists, so frequently met with among the workmen in the Staffordshire Potteries, from the absorption of the mineral poisons used in the glazing department of those manufactories. By referring to our clinical notes, we do not observe a solitary case of disappointment, after

we had introduced the oxygenated bath; and patients who had been previously discharged as incurable were re-admitted, with uniform success. Nor has the effect of the oxygenated bath been less conspicuous in those local inflammatory attacks of the extremities, usually denominated "rheumatic gout." By a reference to our clinical notes, we observe that in several cases the disease disappeared within a few hours after the first immersion.

The temperature of the water, destined to receive the concentrated oxygen, must be as warm as the patient can bear it (about from 90 to 96 degrees of Farenheit's thermometer), and the quantity of oxygen must be determined by its degree of concentration, the state of the patient's habit, and the force of the attack.

We have observed, that to give the oxygenated bath its due operation, the temperature must be *uninterruptedly* kept up at the same degree of heat during the immersion: with this view, we have had constructed an appropriate portable apparatus, which fully answers the purpose; for

unless the process be accurately conducted, disappointment will ensue.

Whether the *modus operandi* of oxygen be the effect of chemical affinity, elective attraction, a renovation of the debilitated absorbents of the extremities, or of their joint co-operation, must be confided to further investigation; but an excretion of matter from the pores of the skin, resembling phosphate of lime, may be readily detected, from time to time, by scraping the limbs after they are removed from the oxygenated bath.

When the morbid action of arthritic acrimony indicates a visit to the head, or any of the viscera, it should be solicited to the extremities by the frequent use of the oxygenated bath;* and if

* Repeated recourse to bathing, in water used for domestic purposes, raised by artificial means to a high degree of temperature, will induce great weakness of the parts immersed, but the OXYGENATED bath, by the stimulus which it imparts, prevents that debility, independently of its solvent action on the extraneous acrimonious matter, and its consequent removal through the exhalants of the skin.

the inflammatory symptoms, at any time, run *unusually* high, in addition to the bath, antimonial diaphoretics, the volatile saline draught, and weak diluents, will be proper. The state of the stomach and bowels should be particularly attended to, especially in those of a full habit; for a retention of the alvine excreta is uniformly succeeded by an increase of irritation, and want of rest.

As on the management of the arthritic in the intervals of repose from a gouty paroxysm will depend the distance, duration, and force of the next fit, so we consider it our duty to close this subject with a continuation of monitory precautions: but should the patient want fortitude to embrace our salutary hints, it is possible that he may derive negative consolation, under present sufferings, from the solitary recollection of past gratifications.*

* Perseverance in the preventive treatment has been so uniformly successful, that no exception has come within our knowledge; on the contrary, we have in our mind's eye a great number of gentlemen, attached from their youth to the

Persons of a corpulent habit, florid complexion, and short neck, familiarized to gout, are liable in advanced age to apoplexy, lethargy, and difficult respiration: these we would recommend to bleed and be cupped occasionally, and if such an attack is suddenly threatened,

sports of the field, who, on reaching the meridian of life, became the subjects of gouty paroxysms, and that, generally, at the season of their usual amusements, who are now able to resume their active pursuits with impunity; and such is the confidence which the preventive plan has inspired, that soda or magnesia, dependant upon the state of the bowels, and secondary tonics, form a prominent item in their daily domestic arrangements, as a surety against the effects of occasional convivial indulgence. We must, however, observe, that we have known a SUSPENSION of those precautions succeeded by THREATENINGS of gouty paroxysm, which vanished on the resumption of the preventive agents. This result having obtained in several instances, we consider conclusive evidence of the correctness of our views on that part of our subject. We must, nevertheless, remark, that when the joints have suffered *partial* disorganization by long-continued accumulation of cretaceous matter, the occasional use of the oxygenated bath, and a more decisive general treatment, is required, before their motive powers can be restored; nor can the solution of that extraneous substance be effected without persevering application.

it should be met by other evacuants, as setons, issues, and cathartics, with a *dry* and abstemious diet, to guard against vascular repletion. Those of a pallid countenance are predisposed to the different species of dropsy and asthma, from a deficiency of crassamentum and a superabundance of serum: the former will require diuretics, cathartics, and tonics of the first class; and the treatment of the latter must be regulated by the attendant symptoms.

Persons of mental placidity require a diversity of gentle stimulants, and those of acute sensibility should be tranquillized by *secondary* sedatives. The robust should take active evacuants, moderate diet, and full exercise. The debilitated require a more generous diet, exercise without fatigue, and powerful tonics.

Sudden changes, from a full to a spare diet, are indiscreet resolves, unless dictated by the presence of *synocha*; but a *gradual* abandonment of irregular habits is directed by the impulse of reason, and followed by positive miti-

gation of suffering. Light food at dinners, and an avoidance of suppers, would seem to be the most judicious arrangement for valetudinarians; and in the article of liquids, it is scarcely necessary to observe, that we drink more than is essential to the purposes of health, and that too often of the most injurious qualities. Upon this subject the reader is referred to our antecedent opinions.

Warm clothing, as a preventive against disease, in our mutable climate, is entitled to attention in this place.* Flannel next the skin, in autumn, winter, and spring, and calico in summer, not only guard covered surfaces from porous obstruction, but they also, by absorbing the cuticular exhalation, prevent the lodgment of *sudor* upon the skin, which is a frequent source of what is commonly known by the name of "a cold:" these waistcoats should be changed two or three times a week, for obvious reasons.

* *Silk* (being a non-electric conductor) forms a good covering, *over the linen*, as it prevents the escape of animal caloric.

During the progress of arthritic paroxysms, *fleecy hosiery* or *cotton wool* appear to be more soft and appropriate covering, for parts labouring under a high degree of morbid excitability, than flannel.

In the absence of the paroxysms, those of a gouty diathesis should use the oxygenated bath once a week, at bed-time, with the view of exciting the remote absorbents to a due performance of their functions, as well as to remove, by *local* cutaneous transudation, any latent saline acrimony that might otherwise threaten a partial deposition.

FINIS

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